

United Kingdom of Great Britain and Northern Ireland

Certificate of EC type-examination of a measuring instrument

Number: UK/0126/0057

issued by the Secretary of State for Business, Innovation & Skills
Notified Body Number 0126

In accordance with the requirements of the Measuring Instruments (Liquid Fuel delivered from Road Tankers) Regulations 2006 (SI 2006/1259) and the Measuring Instruments (Non-Prescribed Instruments) Regulations 2006 (SI 2006/1270) which implement, in the United Kingdom, Council Directive 2004/22/EC, this certificate of EC type-examination has been issued to:

**Johann Heidt Developments
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in respect of a vehicle mounted liquid fuel meter measuring instrument having the following characteristics:

<i>model designation:</i>	<i>Dry Line – Mechanical or Electronic Registers</i>
<i>the maximum rate of flow:</i>	<i>900 litres/minute</i>
<i>the minimum rate of flow:</i>	<i>150 litres/minute</i>
<i>the minimum delivery:</i>	<i>500 litres</i>
<i>the maximum operating pressure:</i>	<i>10 bar</i>
<i>the liquids measured:</i>	<i>Derv, gas oil, kerosene, paraffin</i>

The necessary data (principal characteristics, alterations, securing, functioning etc) for identification purposes and conditions (when applicable) are set out in the descriptive annex to this certificate.



Signatory: P R Dixon
for Chief Executive
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Issue Date: 02 July 2009
Valid Until: 01 July 2019
Reference No: T1121/0009

Descriptive Annex

1 INTRODUCTION

1.1 The pattern is a meter measuring system fitted to a road tanker for the transport and delivery of liquids with low viscosity stored at atmospheric pressure. It is bottom loading, and comprises a pump, a gas extractor or gas separator, a meter, a mechanical or electronic indicator/calculator/pre-setter, mechanical or electronic compatible ancillary equipment, and an empty hose reel. Schematic and photographic views of the system are shown in Figures 1, 2, 3, 4 and 9. The system allows:

- (i) metered delivery by pumping (empty hose) (50 mm)
- (ii) direct unmetered delivery (with or without pumping) without passing through the meter (70 mm).

A pumped air 'blowdown' system is employed to discharge product retained in the hose.

2 CONSTRUCTION

2.1 Mechanical

2.1.1 Hydraulics

The hydraulics system is illustrated in Figure 1, with a key at Section 12 and in Figure 9. Liquid may flow from any of the selected compartments of the cargo tank via the appropriate faucet valve. There is the option of unmetered gravity delivery or pumped delivery via a connecting hose. If pumped delivery is selected, there is the further option of metered or unmetered delivery. If metered delivery is selected, the liquid flows through a filter, gas extractor and meter to a 50 mm dry hose reel. The transfer point is at the valve cl₂, in Figure 1, where air for blowdown is injected.

2.1.1.1 List of pumps

	Manufacturer	Model designation	Nominal bore (mm)
(a)	Blackmer (Geo Meller)	TX and TNP series	50, 64, 75
(b)	Drum Engineering Ltd	FP 65 64	64
(c)	Drum Engineering Ltd	Pluto 3	75
(d)	Drum Engineering Ltd	Mercury 3	75
(e)	Mouvex	CC 20	64
(f)	Orr Pumps	C 250	64
(g)	Peerless Pumps	Varley	64, 75
(h)	Plenty Mirrlees Pumps	Ropak Series	50, 75
(i)	Roper Pump Co	3600/3700 series	50, 75
(j)	Roper Pump Co	4600/4700 series	50, 75
(k)	Wade Engineering Ltd	Gorman Rupp O2F1	50

2.1.1.2 List of gas extractors / gas separators

	Manufacturer	Model designation	EEC pattern approval number
(a)	Geosource GmbH (Smith)		D79 5.153.01
(b)	Actaris Ltd	Air release and strainer	UK81/1767
(c)	Liquid Controls (Alpeco)	Series A 8100	UK81/1783
(d)	Tokheim Ltd	1506	UK81/1791
(e)	Isoil	FDV 75	UK84/1887
(f)	Satam	EC 30.20	UK84/1875
(g)	Schlumberger	Separator FSG48E	F96.00.522.002.0
(h)	Pernin	FSGB 48E	F99.00.522.005.0

2.1.1.3 List of gas separators combined with pump

	Manufacturer	Model designation	EEC pattern approval number
(a)	Blackmer/Mouvex	Mouvex DMX	F89.0.05.462.1.3
(b)	Blackmer/Mouvex	Mouvex DMX II	F95.00.522.002.0
(c)	Blackmer/Mouvex	Mouvex DMX III	F99.00.522.003.0

2.1.1.4 List of meters

50 mm System

	Manufacturer	Model designation	EEC pattern approval number
(a)	Brooks Instruments BV	B1 42	NL80 E56
(b)	Dresser Europe SA	T 50	UK80 1722
(c)	Geosource GmbH	T 11 or ST 40	D80 5.243.10
(d)	Liquid Controls (Alpeco)	M 7, M-15	UK81 1782
(e)	Neptune Measurement Ltd	Type 4 or 40	UK81 1766
(f)	Actaris (was Schlumberger)	4(or 40)-MT	UK97 2459
(g)	Neptune Measurements Ltd	NVR45	F89.0.07.422.2.3
(h)	Isoil	BM 75 T	D81 5.243.19
(i)	Tokheim Ltd	1400-20 1450-20	UK81 1788 UK81 1789
(j)	Satam	ZC 1720/20 ZC 17 20/40	F77 01.422 F77 07.422
(k)	Smith Meters	T.11/ST40 T.20/ST75 T.40/ST160	D 1.51.5034/80

75 mm System

	Manufacturer	Model designation	EEC pattern approval number
(a)	Brooks Instruments BV	B 72 DB	NL79 E40
(b)	Dresser Europe SA	T 75	UK80 1722
(c)	Geosource GmbH	T 20 or ST 75	D80 5.243.11
(d)	Liquid Controls (Alpeco)	M 15 or M 25	UK81 1782
(e)	Isoil	SBM 150	D79 243.01
(f)	Tokheim Ltd	1400-30 1450-30	UK81 1788 UK81 1789
(g)	Neptune Measurement Ltd	Type 4 or 40	UK81 1776/1

2.1.1.5 List of electronic meter registers

	ITEM	TYPE	SOFTWARE	REFERENCE
	<u>Electronic register /control unit</u>			
(a)	Veeder-Root	EMR ³	Edition F04 onwards: Register Head 349785-001 Interconnect Box 349784-001	Evaluation (Test) Cert. GB-1285
(b)	S.A.M.P.I s.p.a	TE550	SD-001-550-027-XX (XX can be any number)	NMI Test Cert. TC3583

2.1.1.6 List of printers

	Manufacturer	Model designation	Approval number
(a)	Epson TM 290	Epson TM 290	-
(b)	DH Technologies	Blaster Printer	-

2.1.1.7 General items

	Manufacturer	Model designation	Approval number
(a)	Meller	Power Junction Box EJB 102	-

2.2 Product in hose detector (on systems fitted with closable nozzle)

A wet/dry sensor is fitted to the entry point of the hose reel. Following delivery and blow down, this sensor should be dry. If for some reason, the hose retains a significant amount of product, this sensor will remain wet and this will cause the vehicle brakes to be locked on. This condition will pertain until the hose is cleared of product. A schematic view of this arrangement is shown in Figure 9 (S2).

2.3 Run dry sensor (automatic blowdown) (manifold systems only)

A wet/dry sensor is fitted just ahead of the pump which detects when the delivery system is about to run dry, either due to a compartment valve being closed or because the compartment has emptied. When this condition is sensed, a high capacity air vent is opened to allow a suitable flow of air to enable the hose to be cleared of product. This arrangement is shown schematically in Figure 9.

2.4 Product return guard bar counter (product return systems only)

Where a product return nozzle is fitted on each compartment outlet a guard bar has to be lifted to access any of the product return nozzles. A pneumatically operated event counter is fitted which increments a counter display each time the guard bar is lifted.

2.5 Hose closure device

The use of a closure device on the hose, such as a ball valve is permitted subject to the conditions detailed below. This is to be operated in the event of a tank overfill, or to prevent leakage on customers property, or in transit. This facility is only permissible when the following safeguards and conditions are met.

- (i) The 'product in hose' system of Section 2.3 must be fitted.
- (ii) Where the optional product return system is fitted, the 'guard bar counter' system of Section 2.4 must be fitted
- (iii) Where the optional manifold system is fitted, the 'product in hose' detector of Section 2.3 must be fitted
- (iv) The only closure shall be the valve such that when open, the hose may be observed to be clear. Anti-siphon devices or similar shall be removed. A typical closure device is shown in Figure 10.
- (v) The volume of the hosereel shall be shown on a plate permanently and clearly displayed adjacent to the hosereel. In the event of tank overfill (frustrated delivery) or any circumstance whereby the 'product in hose' system of Section 2.3 is activated, the customer shall be issued with a credit note for the full hosereel volume, to be deducted from the indicated delivery amount. The credit note will state the volume of the hosereel and identify the hose number and vehicle details.

3 TECHNICAL DATA

3.1 Metrological parameters

model designation:	Dry Line – System
the maximum rate of flow:	900 litres/minute
the minimum rate of flow:	150 litres/minute
the minimum delivery:	500 litres
the maximum operating pressure:	10.5 bar

Liquids measured:	Derv, gas oil, kerosene, paraffin.
Climatic environment:	-10 °C to +40 °C Open, condensing
Electromagnetic environment:	E3
Mechanical environment:	M2 (vehicle mounted)

Note: The maximum rate of flow, however, must not be greater than the maximum rate of flow of any component of the system.

3.2 Supporting Documentation

MDS_elec_001 - Monitored Dryline System Wiring & Pneumatic Connections

For TE550 Electronic meter:

MA_84 Rev. 00	Installation, use and service manual
MA_64	Communication protocols
SE_83	Interconnecting wiring diagram
SE_84	Internal wiring diagram

For EMR³ Electronic Meter:

EMR³ setup manual rev 1.pdf
EMR Troubleshooting Addendum_2

4 OPERATION

4.1 Description

The hydraulic component references within this section refer to Figure 1 and the associated key of Section 12.

The system allows pumped metered delivery through the hose reel (dry hose) or pumped or gravity-fed unmetered delivery through a bulk (dry) hose.

For metered deliveries, the controller is set to delivery mode and the desired delivery quantity is pre-set, less an estimated amount for product retained within the pipework between the jumper hose inlet and the meter (Fy and C in Figure 1). The pre-set quantity is automatically discharged.

4.2 Blowdown

Use of the dry hose system results in a quantity of product being retained within the hose towards the end of the delivery. The 'blowdown' system uses the cargo pump as a compressor to generate enough air to clear the dry hose of product, thereby completing the delivery.

The meter is protected from the blowdown air flow. The product retained in the pipework is driven through the meter until the pump starts to run without product and produces compressed air. This air enters the gas extractor chamber (Pg in Figure 1). Because the float will now be in the down position, all of the air is vented into the expansion box (EB). The air takes two paths: one to the differential valve (cl_1) to close it and thereby prevent the meter from receiving the blowdown air; and the other to the non-return valve (cl_2), which forces product out of the hose line.

For systems fitted with a manifold system, the process is automatic and is as described in Section 2.3. See also Figure 9.

4.3 Completion

On completion of 'blowdown', the manifold and footvalves are closed and the delivery ticket shall be printed.

4.4 Frustrated delivery (customer tank overfill)

The volume of the hosereel will be shown on a plate permanently and clearly displayed adjacent to the hosereel. In the event of tank overfill (frustrated delivery) the wet hose sensor of Section 2.2 will hold the vehicle brakes locked.

The hose contents form part of the delivery and thus the customer must be issued with a credit note for the full hose quantity.

On mechanical metering systems fitted with product return, an interlock provision is the evidence provided by the guard bar register. For meters with electronic heads, operation of the guard bar is interlocked with the guard bar sensor which is utilised to modify the ticket print out to record the operation of the guard bar and to indicate to the customer that a credit note is due.

Note: Provision may be made on the vehicle for a brake interlock over-ride device, to allow the vehicle to move in emergency or mechanical failure situations. Where fitted, this device shall be secured to provide evidence of tampering. If this seal is broken for any reason, the closure device must be removed and cannot be re-fitted until the securing of the brake interlock override device is secured.

5 INTERLOCKS AND SECURITY FEATURES

5.1 Interlocks are dependent upon which meter controller is used. The mechanical systems have very little interlocking except that a ticket must be in place before the delivery commences. The electronic register controller systems have greater interlock capability and the certification listed in Section 2.1 shall be referenced.

6 INSCRIPTIONS

6.1 System data plate (Figure 11)

6.1.1 The instrument bears the following legends:

Manufacturers mark or name
Accuracy class
Maximum operating pressure
Operating temperature range
Minimum delivery
Flow rate range
Serial number
Certificate number

'CE' marking
Supplementary metrology marking
Notified body identification number

7 SOFTWARE VERIFICATION AND CONTROL

7.1 The software version numbers for electronic register/controllers is listed in 2.1

7.2 The legally relevant software may not be changed without the prior approval of the National Weights and Measures Laboratory.

8 SECURING (SEALING) - LOCATION OF VERIFICATION MARKS

The following shall be secured to prevent unauthorised adjustment or dismantling:

- (a) the meter and gas extractor in accordance with the requirements of the relevant pattern approvals, including the joints in the vent pipe from the gas eliminator.
- (b) the plate referred to in Section 6.1 shall be secured to a support of the system.
- (c) where pulse output devices and/or electronic register/controllers are utilised, these shall be secured in accordance with their pattern approvals.
- (d) any reset device on the guard bar event counter shall be secured in a manner that prevents unauthorised alteration of the consecutive display.
- (e) Where the brake interlock override device of is fitted, it shall be secured to prevent ready access and to provide evidence of tampering.

9 AUTHORISED ALTERNATIVES

9.1 As described in the descriptive annex, but for retro-fit purposes, having top loading. These vehicles will not be fitted with manifold or product return systems.

9.2 Having the capability to deliver a maximum flowrate of 750 litres/minute with meter a), or 800 litres/minute with meter b), on the 50 mm system. Components used are:

	Manufacturer	Model designation	EEC pattern approval number
	Meter		
(a)	Neptune Measurements Ltd	NVR45	F89.0.07.422.2.3
(b)	Actaris	4(or 40)-MT	UK97 2459
	Gas extractor		
(a)	Alpeco Ltd	A 8100	UK81 1783
(b)	Schlumberger	FSG48E	F96.00.522.002.0

9.3 Optional additional empty bulk hose

Having a modification to the outlet side of the delivery system to allow the additional optional use of an empty bulk hose. Delivery via hose reel or bulk hose is selected by means of a two way valve. The system thus allows:

- (a) metered delivery by pumping (empty hose reel)
- (b) metered delivery by pumping (empty bulk hose)
- (c) direct delivery, with or without pumping, without passing through the meter

The modified part of the system is shown in Figure 5 which is accompanied by a key. A pneumatic interlock system is incorporated which prevents the hose changeover valve from being operated during delivery, Figure 6 refers.

9.4 Modified delivery system

9.4.1 Description

Having a modification to the outlet side of the delivery system. Authorised Alternative 9.3 above permits the optional use of an additional empty bulk hose with delivery via hose reel or bulk hose being selected by means of a two way valve. This alternative retains the empty bulk hose, but provides the option to deliver via a full (wet) hosereel. The modified system thus allows:

- (a) metered delivery by pumping (empty {dry} bulk hose)
- (b) metered delivery by pumping (full {wet} hosereel)
- (c) direct delivery, with or without pumping, without passing through the meter

The modified system is shown in Figure 7 to this amendment which includes a key showing the relevant components.

9.4.2 Operation

The two, 3-way valves, are operated by semi-rotary pneumatic actuators. When activated, both valves operate simultaneously providing a choice of either hosereel or bulk delivery.

Special valve R1 is fitted to the gas extractor vent and diverts extracted air to either atmosphere (if wet hose operation is selected), or to the dry hose system for blowdown.

Special valve R2 is fitted immediately after valve C11 and diverts metered products to either Wet line hosereel or to the bulk outlet with attached dry hose components.

Valve operation is synchronised to combine atmospheric venting with hosereel operation or alternatively, a high flow metered bulk with dry hose properties.

9.4.3 Interlocks

Dry hose components are fitted after special valve R2 and interference with pneumatic controls prevent the “Wet” system hosereel receiving blown air.

Interlocks are designed into the pneumatic control system to prevent the mode of delivery (e.g. hosereel or bulk) being changed once the delivery has commenced.

The pneumatic control system is supplied from an auxiliary vehicle reservoir. A protected circuit valve prevents the PTO from being engaged until a full supply is also fed to the control system, thus preventing unsynchronised delivery.

The two 3-way valves, operated by semi-rotary pneumatic actuators, operate simultaneously ensuring that operation is either hosereel or bulk delivery.

Special valve R1 is fitted to the gas extractor vent and diverts extracted air to either atmosphere (if wet hose operation is selected), or to the component parts of the dry hose system.

Special valve R2 is fitted immediately after valve C11 and diverts metered products to either Wet line hosereel, or to the bulk outlet (dry hose). Interlocks are designed into the pneumatic control system to prevent the mode of delivery (e.g. hosereel or bulk) being changed once the delivery has commenced.

Valve operation is synchronised to combine atmospheric venting with hosereel operation, or a high flow to clear the dry hose. Dry hose components are fitted after special valve R2. This, in conjunction with pneumatic controls ensures that air cannot be inadvertently applied to the ‘wet’ hosereel.

9.4.4 Securing (sealing)

9.4.4.1 The following points correspond to Figure 8 and shall be secured.

Figure 8, securing (sealing) references:	
(1)	Compression joint air eliminator
(2)	Compression joint air eliminator
(3)	Compression joint special valve R1
(4)	Compression joint special valve R1 Wet hose vent system
(5)	Anti tamper seal dry hose system
(6)	Anti tamper seal air eliminator to meter body
(7)	Compression joint dry hose system
(8)	Anti tamper seal special valve R2
(9)	Compression joint air check valve c11

9.4.4.2 References for the securing arrangements of the further authorised alternatives detailed in Section 2, may be found in the certification listed.

10 RECOMMENDED TESTS

10.1 In additional to the standard inspection tests, verify that the interlocks and security features described in Section 5 are operative.

10.2 Verify that software issue status is as described in Section 7.

10.3 Verify that where a hose closure device is fitted, the conditions of Section 11 are fulfilled.

11 CONDITIONS

11.1 The operator shall retain traceable records of event counter totals for each vehicle.

KEY TO HYDRAULICS DIAGRAM (Figure 1)

Key to hydraulics diagram (Figure 1)

A	Anti-swirl device
M	Optional manifold. Where this is fitted means are provided to prevent transfer of liquid between compartments by adequate foot valves, faucet valves, non-return valves or interlock mechanisms.
Vft	Compartment foot valve) The two valves are of the 'open or closed' type
Vfc	Faucet valve) which render any slowing down at the pump intake practically impossible
Fy	Optional additional hose for gravity unmetered delivery.
Fx	Connecting hose to compartments; this is as short as is practicable (jumper hose)
Fp	Filter (pump)
P	Pump
R	Optional valve for pumped unmetered delivery.
Fc	Filter (meter)
Pg	Gas extractor.
Eb	Expansion Box
C	Meter
Vm	Operating valve which may be connected to the pre-setting mechanism of the meter
SA	The above four items Fc, Pg, EB, C, Vm, cl ₁ and cl ₂ are usually a complete sub-assembly of the meter
cl ₁	Non return valve (pressure assisted)
cl ₂	Non return valve (point of transfer)
I	Empty hose

13 CERTIFICATE HISTORY

ISSUE NO.	DATE	DESCRIPTION
UK/0126/0057	02 July 2009	Type examination certificate first issued.

ILLUSTRATIONS

Figure 1	Hydraulics
Figure 2	General view of system
Figure 3	General view of external cabinet
Figure 4	View showing jumper hose
Figure 5	Amended hydraulics, Authorised Alternative 9.3
Figure 6	Pneumatic interlock system
Figure 7	Amended hydraulics, Authorised Alternative 9.4
Figure 8	Sealing arrangements
Figure 9	Hydraulic diagram, monitored system and key
Figure 10	Examples of closable nozzles
Figure 11	Data Plate

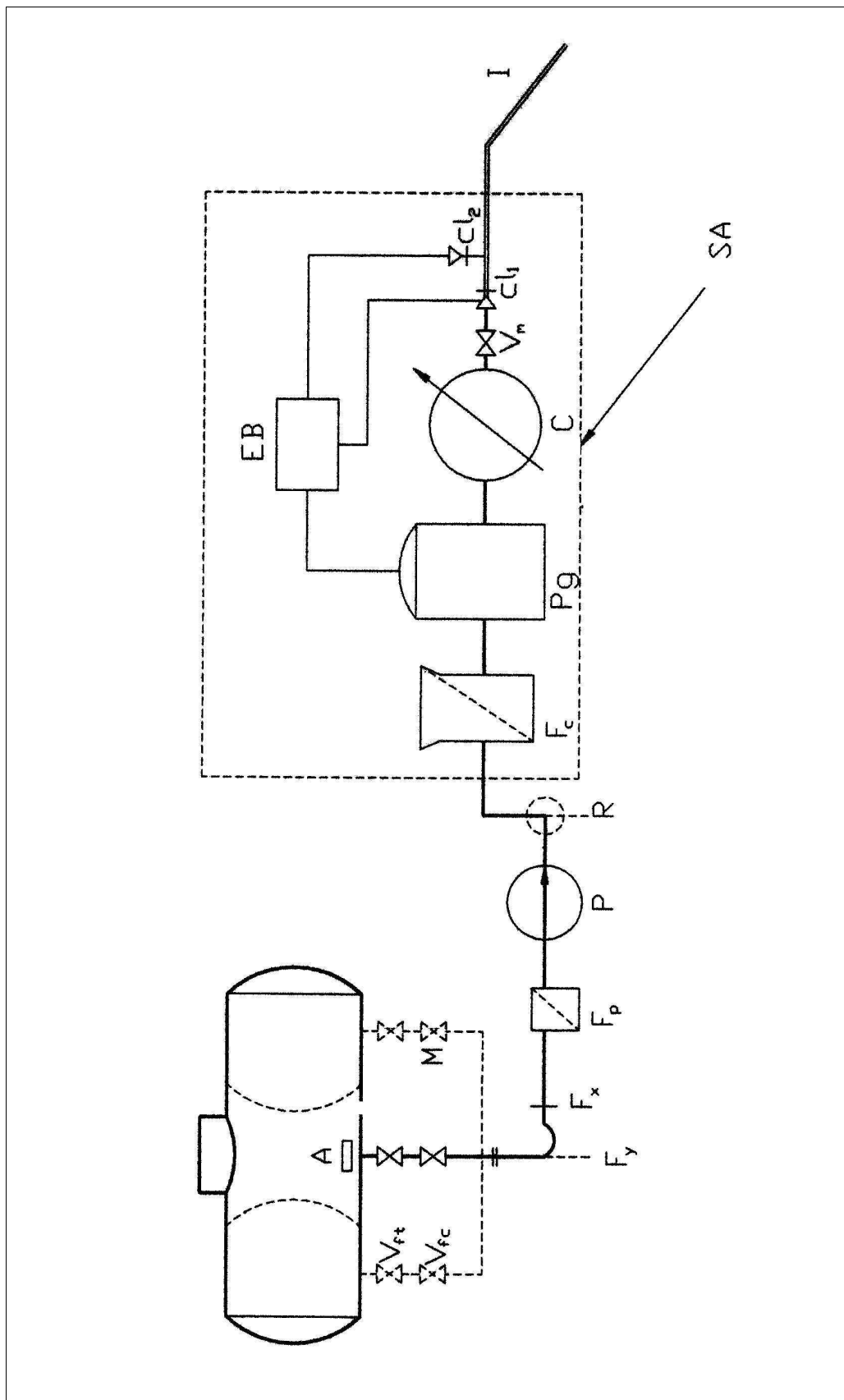


Figure 1 Hydraulics



Figure 2 General view of typical system

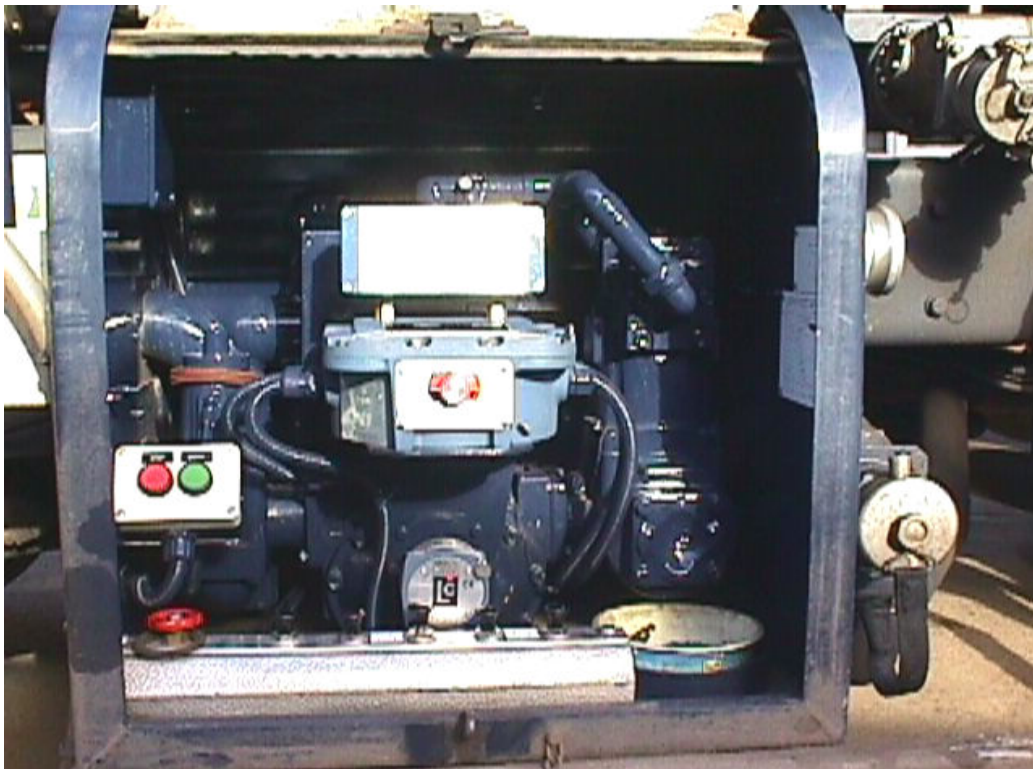


Figure 3 General view of external cabinet showing typical metering system

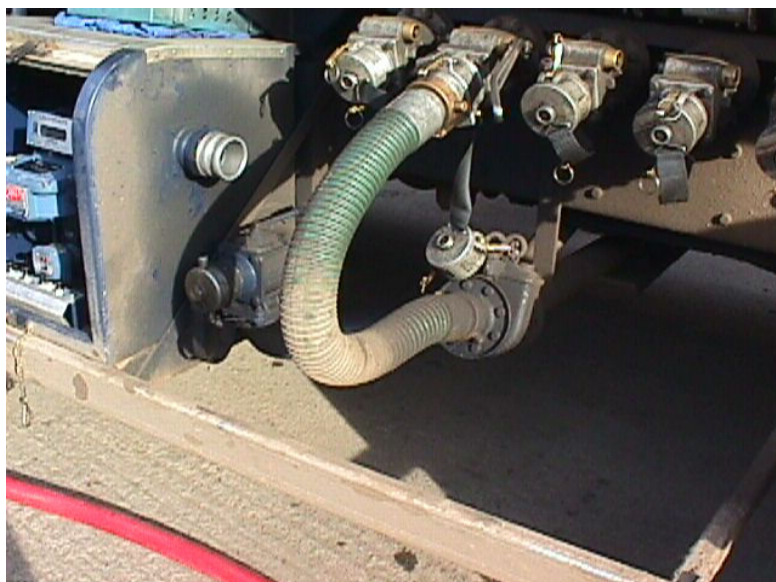


Figure 4 View showing jumper hose

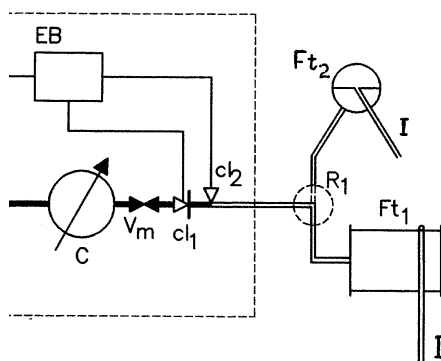


Figure 5 Amended hydraulics, Authorised Alternative 9.3

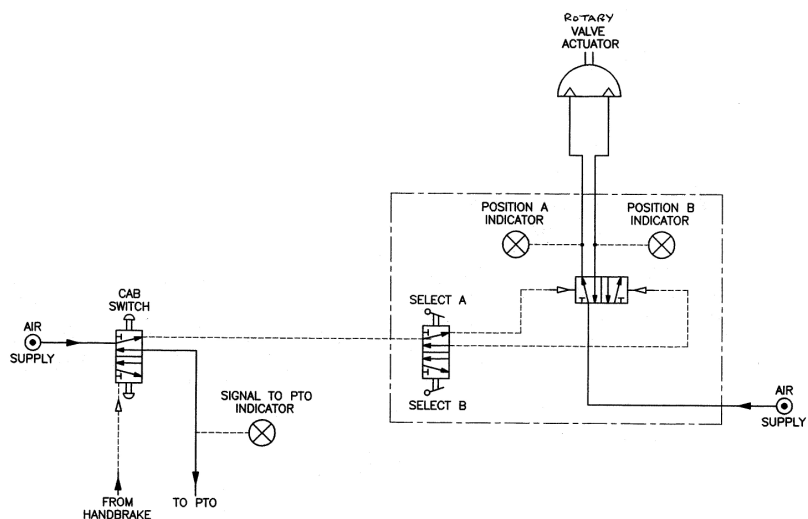


Figure 6 Pneumatic interlock system

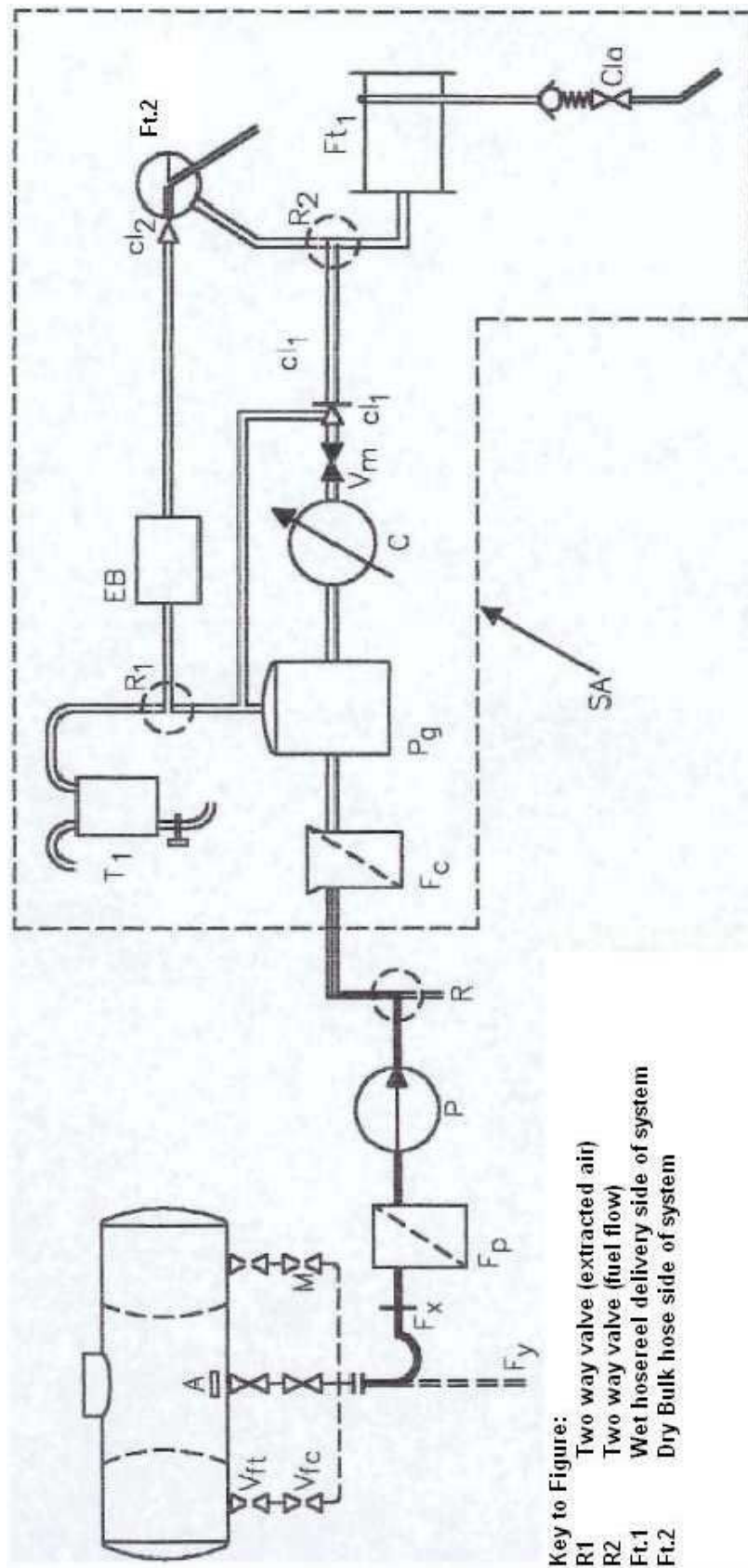
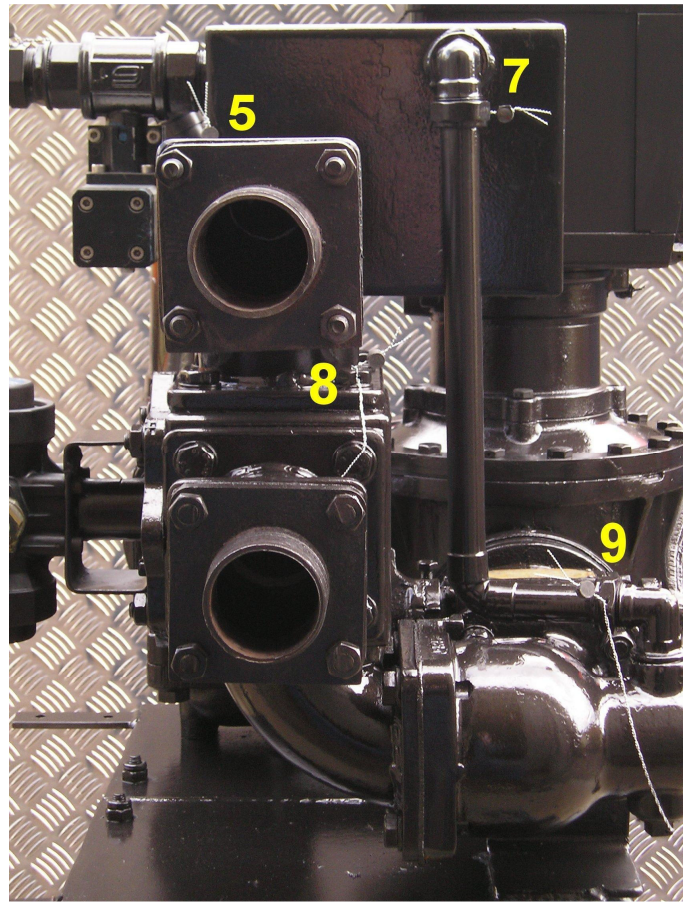
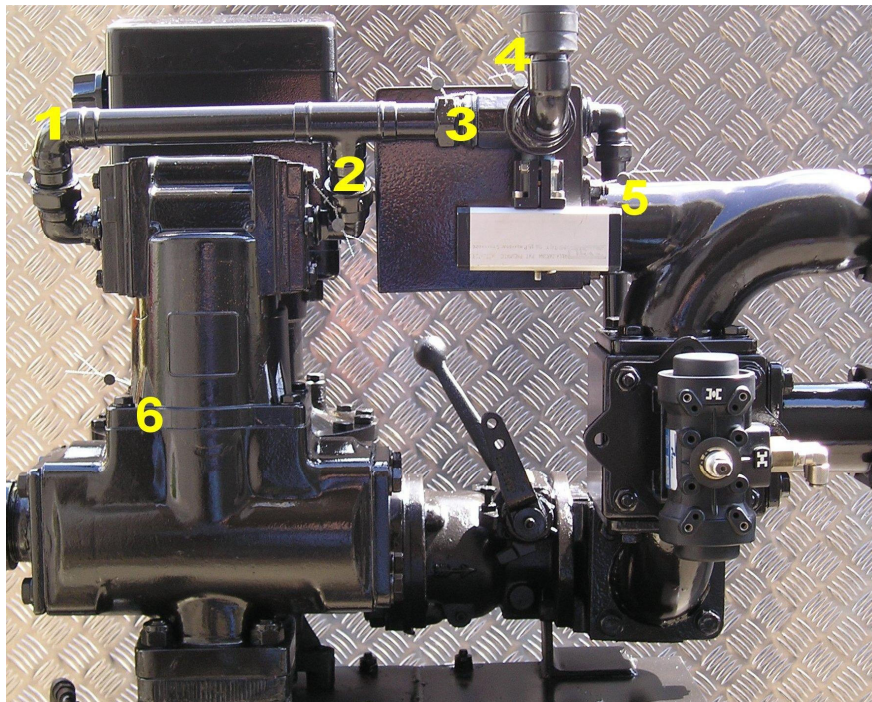


Figure 7 Amended hydraulics, Authorised Alternative 9.4



(a) left



(b) rear

Figure 8 Securing (sealing) arrangements

A	Anti-swirl device
M	Optional manifold. Where this is fitted, means are provided to prevent transfer of liquid between compartments by adequate foot valves, faucet valves, non-return valves or interlock mechanisms.
Fy	Optional additional hose for gravity unmetered delivery.
Fx	Connecting hose to compartments; this is as short as is practicable (jumper hose)
Fp	Filter (pump)
P	Pump
R	Optional valve for pumped unmetered delivery.
Fc	Filter (meter)
Pg	Gas extractor.
Eb	Expansion Box
C	Meter
Vm	Operating valve which may be connected to the pre-setting mechanism of the meter
cl1	Non return valve (pressure assisted)
cl2	Non return valve (point of transfer)
SA	The above items Fc, Pg, EB, C, Vm, cl1 and cl2 are usually a complete subassembly of the meter
Cla	Hose closure, (<u>no</u> anti siphon valve)
I	Empty hose
S1	Sensor 1
S2	Sensor2
Vb	Vacuum breaker

Figure 9 Key



Figure 10 Examples of closable nozzles



		Hoobrook Trading Estate Worcester Road Kidderminster DY10 1HY 01562 822446		CE	M09 0126
		DRY LINE MEASURING SYSTEM			
SERIAL No	<input type="text"/>		<input type="text"/>	mm	
YEAR OF MFR.	<input type="text"/>		SEAL		
MAX FLOW	<input type="text"/>	l/min	MAX PRESS	10 BAR	
MIN FLOW	<input type="text"/>	l/min	MIN DELIVERY	500 L	
CERTIFICATE NO	UK 0126 0057		LIQUIDS MEASURED		
			GAS OIL	DERV	
			PARAFFIN	KEROSENE	

Figure 11 Data Plate